Design for Digital Printing

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• Technology overview
  History
  Technology after ITMA 2003
  Case Studies (Europe and US)
• New design possibilities by digital printing technology
  HD Imaging
  New Design Styles
• Into the future
  Materiality
  Neo cottage Industry
  Research
History

- 1878  The principal mechanism (Lord Rayleigh)
- 1960s  First inkjet system (Continuous Inkjet System)
- 1972  Piezoelectric D.O.D. heads by Clevite Corp in Ohio
- 1979  Thermal D.O.D. inkjet heads. (HP and Canon -bubble jet)
- 1995/96  Seiren Viscotex System (Production inkjet printing on cloth)
- 1995/96  Encad TX 1500 series
- 1998/99  Large Format sampling Printer (Mimaki TX series)

- 2003-  Production Printers (ITMA 2003)
  (Dupont, Mimaki, Reggiani, Robustelli, Konica/Minolta)

Flat-bed Garment Printer
  (Mimaki, US Screen Printing, Kornit, Brother)
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Technology after ITMA 2003

• Developments of high speed production digital printers
• Increasing ability for a variety of textile materials
• Increasing printing assurance

Shifts towards High Speed Production Printers
Production Digital Printers

Short Run Sample Printers
  Mimaki: (TX-1, TX-2) TX-3: 2,000+ units

Medium Speed Production Printers
  Dupont: (3210) 2020: 200+ units
  Robustelli: Monna Lisa: 100+ units
  Konica / Minolta: Nassenger V: 100+ units

High Speed Production Printers
  Reggiani / Huntsman / HP: DReAM: 30+ units
Production printer v.s. Short run sample printer

- Greater printing speed
  - Sample: 2 - 5 sq meters / hour
  - Mid: 10 - 60 sq meters / hour
  - Full production: 2.5 sq meters / minute

- Material handling
  - Adhesive belt system
  - Greater head clearance

- Bulk ink delivery system

- Most installments: Italy
Silk Printing: (Como region)

- It is known for high end apparel prints including silk scarves and ties. - Mantero and Ratti

- Integrations of conventional and digital productions. (design looks and cost)

- Multiple Mimaki TX-2 printers and Production printers (Robustilli Monna Lisa and Dupont 2020) for productions.

- 6000 meters of productions with TX-2.

- “Speed is not the issue, the quality is.”
Nomega digital printing (commission printer)

- Founded as a dyer - full digital production mill

- 12 Monna Lisa printers for reactive and acid dye print (cotton, silk, wool, viscose and polyester)

- Printing charge: 8 - 10 euro per yard (plus fabric costs: 200 meters minimum)

- 3000 linear meter (daily)
Other digital printing mills in Europe

Miroglio: Vertical operation from original designs to production for apparel market. (40 million meters per year).

9 rotary printers in 3 shifts from Mon to Sat. (1200 meter per colorway).
10 x Konica / Minolta Printers – 6 Reactive, 2 acid and 2 disperse
6 x Mimaki TX2 for sampling and strike-offs.

5000 m is breakeven point (rotary and digital inkjet).

Leggiuno: Konica / Minolta Printers for high end fashion (cotton, linen / silk).

Luca: 2 x Reggiani DReAM printers for cotton fashion printers (D&G).

Olognia: 1 x Reggiani DReAM printer for high-end bedding market.

Creation Baumann: Vertical high-end furnishing fabric producer.

3 x TX2 and 4 x TX1 with Reactive and Disperse printing for 8 base fabrics including Trewia CS.

60 designs for 2 collections including 3-4 inkjet design per year.
Digital printing operations in the U.S.

• Increasing numbers of digital printing service operations:
  

• Development of digital production commission printing mills:
  
  Eastern Silk Mills:  (Elizabeth NJ)
  2x Dupont 2020 printers specialized in acid dye printing on silk.

  Dream Digital Fabric Printing Services: (Orangeburg, NY)
  2x Reggiani DReAM printers for acid and disperse dye printing.
  Industrial scale Pre- and post- treatment facilities.  (in progress)

  Advanced Digital Textiles (Master Screen): (Charlotte, NC)
  1x Reggiani DReAM printer for disperse (acid) dye printing.
  Industrial scale Pre- and post- treatment facilities.  (in progress)

  Carlisle Finishing (formerly Cone Mills): (Carlisle, SC)
  One of the biggest textile printing mills in the US.
  Over 100 million meters of printing production in their heyday.
  Multiple modified Mimaki type printers.
  Only specialized in cotton / line prints for home furnishing markets.
  $50 per yard (less than 50 yards) and $21 - 25 per yard (over 50 yards)
Eastern Silk Mills, Elizabeth NJ

- Silk Printing for US fashion
- Started with Table Printing
  Carriage Printers
  Turn Table Printers
- Inkjet for Economical Needs
  Conventional
  40 mins (1 color) - 1 piece
  1 day (10 colors) - 1 piece
  * Skill and Experience
- Digital (Dupont Printers)
  2 hours (180 + 180 dpi) - 1 piece
New design possibilities by digital printing technology

• HD Imaging

• New Design Styles
High Definition Imaging (1)

One of the characteristics of digital inkjet printing is an ability to print images without aids of screens and screen engraving.

This does not mean eliminations of “Color Separations”.

Color Separation:

• Helps to generate color-ways
• Hybrid of the conventional printing
• Leads to HD imaging (tonal)
High Definition Imaging (2)

• Rasterizing for conventional printing:
  Consists of raster dots.
  50 to 150 dpi depending on types of printing technologies.

• Digital Printing
  256 grayscales - 540 to 720 lpi (printer’s printing resolutions).
  Tonal generations are true to the original images.
  HD Imaging.
New Design Styles

• Photographic
• Unlimited use of color
• Diminutive
• Digital effect
• Engineered
Photographic
Unlimited Use of Colors
Setola to Run Oxford’s Core Men’s Groups

By BRENDA LLOYD

ATLANTA — Just five months after it acquired Tommy Bahama, Oxford Industries got a second thumbs-up from the industry last week when it snagged Michael J. Setola as president.

The appointment will allow J. Hicks Lanier, who’s been president, chairman and CEO of Oxford Industries since 1984, to share some of the responsibilities at the Atlanta-based apparel manufacturer.

In June the complexion and workload at Oxford changed dramatically when...

See SETOLA, page 6
Diminutive
image transferring medium creates textile designs without step and repeat requirements. Similarly, digital printing technology has come to the forefront in recent years, offering greater freedom in design and production capabilities. Digital printing technology allows for the creation of unique, one-of-a-kind designs that can be produced on-demand, eliminating the need for traditional physical printing processes. The technology works by converting digital files into physical designs, allowing for greater flexibility and creativity in the textile industry.

Conversely, digital printing technology is also used in the fashion industry. In particular, digital printing technology is used in the creation of fashion designs. This technology allows designers to create unique designs that can be produced on-demand, eliminating the need for traditional physical printing processes. The technology works by converting digital files into physical designs, allowing for greater flexibility and creativity in the fashion industry.

The use of digital printing technology in the textile industry has also led to a revolution in design. Designers can now create complex, custom designs that can be produced on-demand, allowing for greater flexibility and creativity in the textile industry. The technology allows for greater control over the design process, allowing designers to create unique designs that can be produced on-demand, eliminating the need for traditional physical printing processes. The technology works by converting digital files into physical designs, allowing for greater flexibility and creativity in the textile industry.

In conclusion, digital printing technology has transformed the textile industry, allowing for greater flexibility and creativity in design. The technology has led to a revolution in design, allowing designers to create complex, custom designs that can be produced on-demand, eliminating the need for traditional physical printing processes. The technology works by converting digital files into physical designs, allowing for greater flexibility and creativity in the textile industry.
Digital Effects
Engineered
Into the Future

- Materiality
- Neo Cottage Industry
- Research
Materiality

- Textile Materials
- Surface Imaging
Textile Materials

(Tactile Quality)
Surface Imaging
“We would not like our designs to look like digital. Our designs should look hands-on but retain the quality that only digital printing can do.”

By Carlo Mantero
Neo Cottage Industry
Digital Strike-off / Production Workflow

- Most popular use of digital printing technology today.
- **Market testing** - Engraving - Conventional production printing.
- **Market testing** - Digital production printing.
- Reduce S/O (sampling) time and engraving cost.
- Quick response to the market.
- **Mass Customization / Personalization**
Neo Cottage Industry Model

- Individual designers with digital textile printer can produce short to medium run production (1 - 100 yards +).
- **Individual Designers can directly deal with end users.**
- Larger volume can be outsourced to commission digital textile printers.
- Synchronization between small digital printers to mid / high end printers. (new trend)
- Quicker response to the market.
- New Styles of Designs
Alternative Manufacturing
Personalization with digital printing

"portrait pajamas" ink jet print on silk by ION

tailored by Turnbull & Asser London

custom made gift commissioned by client for golden anniversary
PHOTO SHOP

You’re so vain, you probably think this thong is about you. Thanks to digital print technology, three weeks after leaving a picture at Brazilian label Rosa Chá’s in-store shop at Bergdorf Goodman, you’ll be flaunting a bikini adorned with your own image. Modest types can opt to use a photo of a boyfriend, a favorite pet, or a sunset.
Step 1: provide photo
Email a digital photograph of the home to info@designerxtiles.com (jpg, tiff or pdf)

Step 2: review proof
Take a look, show it to your client, discuss revisions.

Step 3: approve placement
Our textile designers will walk you through adjustments to placement and scale. Filler items will be added if necessary to balance the design.
More Research
(Problems to be solved)

- Speed of printing production
- Penetration of colorants to the textile substrates
- Color Gamut
- Specialty printing

To provide information in neutral position.
The technology was still early development stage and many commercial advertisement as information sources.

To conduct design / engineering research.
Research projects (design and technology)
Proof-of-concept projects
Testing
Production printing

To conduct educational events.
Printers

Thermal Head: DisplayMaker FabriJet (McDermid ColorSpan)
TX-1500 (Encad)
DesignJet 500 (HP)

Piezo Head: TX-1, TX-2, GP-604 for Flat bed garment (Mimaki)
Amber (Stork) x2
Falcon, Falcon Plus (Mutoh)
Hifi Jet (Roland)
Epson 3000

Scanner
Contex 42” large format scanner

Software
ErgoSoft, Wasatch, etc.

Colorants
Ciba Specialty Chemical, Dupont Inkjet, DyStar,
Rohm and Haas, Sensient, Trident, etc.

Others
Digifab, Improved technologies, Jacquard inkjet,
Test Fabrics, etc.
Research

• Design research
  New design styles
  New product application and production workflows
  “Textile Design Analysis Using Computer Visions”
  “Smart Algorithm for Printed Textile Design”

• Engineering research
  “Creation of Textile-Based Durable Printed Antenna Systems”
  “Encapsulated Ink for Digital Ink Jet Technology”
  “Integration of fabric formation and coloration processes
  “Universal Set of Dyes for Digital Inkjet Textile Printing”
  “Nonparticulate Textile Colorants for inkjet textile printing”
  “Inkjet printing textile archives - Barnes Museum”, etc.

• Proof-of-concept projects
  Inkjet printing for Military Camouflage printing
  Inkjet printing narrow band
  Printed nonwoven product development
  Chemical Impregnations, etc,

• Testing (Print performance, Line acuity, optical density, fastness, etc.)
  Various inks and substrates

• Production (samples to short runs)
  Scarves, ties, umbrellas, bags, T-shirts, yardages.
Education

• Conferences and workshops
  Designer Meets Technology (2004)
  Designer Meets Technology: Europe (2005)
Digital printing of textiles (WTP)

Edited by H Ujie, Centre of Excellence in Digital Ink Jet Printing, Philadelphia University, USA

At present the textile industry produces the majority of its 34 billion square yards of printed textile fabric by screen printing. However as we move into the digital age developments in digital printing of paper are being adapted more and more for the textile market. Inkjet textile printing is growing while growth in analog textile printing remains stagnant. As digital print technologies improve offering faster production and larger cost-effective print runs, digital printing will grow to become the technology that provides the majority of the world’s printed textiles.

This comprehensive introduction to the subject is broken into five sections. After two introductory chapters, it goes on to look in a number of detailed chapters at printer and print head technologies. The next section examines the printer software required for successful colour design and management. The digital printing colouration process is explored next, with chapters on substrate preparation, pigmented ink, aqueous inkjet ink, pre-treatment and printing on cationized cotton with reactive inks. The book is concluded with three chapters on the design and business aspect of digital printing.

Digital printing of textiles contains fundamental technical explanations along with current research, and will prove to be an invaluable guide for product developers, retailers, designers and academic researchers.

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